

## Pyrolysis of Ethylene Vinyl Alcohol (EvOH)

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**Abstract:** Plastics are extremely versatile materials with a wide range of applications. However, akin to other materials, they are not without their drawbacks. One of the most pressing problems of today's world is the escalating accumulation of plastic waste. About 460 million tons of plastics were produced in 2019. Although plastic production seems to be increasing year by year, the global recycling rate is still very low at 9% [1]. Multilayer plastic packaging accounts for 100 million tons of plastic generation. They are made up of many distinct polymeric and non-polymeric layers like polyolefins, polyesters, tie layers, adhesives, paper, and foil, which makes them very difficult to recycle [2]. EvOH is a copolymer made up of ethylene and vinyl alcohol. Its remarkable barrier properties make it an essential component within the domain of multilayer plastic packaging [3].

Pyrolysis is a promising technology to recycle plastic waste. It is a thermal decomposition process that takes place in an inert atmosphere at elevated temperatures. This process yields char, gases, and pyrolysis oil as its resulting products [4,5].

In this work, the pyrolysis process is explored as a recycling method for EvOH. A pyrolysis-two-dimensional- gas chromatography-time of flight mass spectrometry-flame ionization detector (Py-GC×GC-TOFMS-FID) system is used for this purpose. Two-dimensional gas chromatography is a sophisticated technique that helps us in separating the pyrolyzates by minimizing coelution, and improving resolution in chromatograms, among other advantages. Major compounds obtained from the pyrolysis of EvOH have been identified and quantified. Thermogravimetric analysis of different grades of EvOH (27 mol% and 32 mol%) has also been carried out. The maximum degradation temperature ranges from 395°C to 398°C. This information provides us with deeper insights into the degradation reaction mechanism of EvOH. These insights will be invaluable in formulating effective approaches for recycling polymers such as EvOH.

### References:

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